MONTHLY WEATHER REVIEW.

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The MONTHLY WEATHER REVIEW summarizes the current manuscript data received from about 3,500 land stations in the United States and about 1,250 ocean vessels; it also gives the general results of the study of daily weather maps based on telegrams or cablegrams from about 200 North American and 40 European, Asiatic, and oceanic stations.

The hearty interest shown by all observers and correspondents is gratefully recognized.

Acknowledgment is also made of the specific cooperation of the following chiefs of independent, local, or governmental services: R. F. Stupart, Esq., Director of the Meteorological Service of the Dominion of Canada; Señor Manuel E. Pastrana, Director of the Central Meteorological and Magnetic Observatory of Mexico; Camilo A. Gonzales, Director-General of Mexican Telegraphs; Capt. I. S. Kimball, General Superintendent of the United States Life-Saving Service; Commandant Francisco S. Chaves, Director of the Meteorological Service of the Azores, Ponta Delgada, St. Michaels, Azores; W. N. Shaw, Esq., Director Meteorological Office, London; Maxwell Hall, Esq., Government Meteorologist, Kingston, Jamaica; Rev. L. Gangoiti, Director of the Meteorological Observatory of Belen Collegel Havana, Cuba; Luis G. y Carbonell, Director, Meteorologica, Service of Cuba, Havana, Cuba; Rev. José Algué, S. J., Director of the Weather Bureau, Manila Central Observatory, Philippines; Maj. Gen. M. A. Rykachef, Director of the Physical Central Observatory, St. Petersburg, Russia; Carl Ryder, Director, Danish Meteorological Institute, Copenhagen, Denmark.

As far as practicable the time of the seventy-fifth meridian is used in the text of the MONTHLY WEATHER REVIEW.

Barometric pressures, both at land stations and on ocean vessels, whether station pressures or sea-level pressures, are reduced, or assumed to be reduced, to standard gravity, as well as corrected for all instrumental peculiarities, so that they express pressure in the standard international system of measures, namely, by the height of an equivalent column of mercury at 32° Fahrenheit, under the standard force, i. e., apparent gravity at sea level and latitude 45°.

FORECASTS AND WARNINGS.

By Prof. E. B. GARRIOTT, in charge of Forecast Division.

Pressure distribution over the Northern Hemisphere during the month was not sufficiently stable to permit of any definite forecasts of the weather beyond the usual period of two days. The type, while of the early winter character, was poorly defined, resulting in generally unsettled weather thruout the United States, but without well-developed storms over the eastern and southern districts. The British Islands and continental Europe were also unusually free from storms and there were but two, both over the extreme northern districts, that were in any manner worthy of notice. Over Siberia the pressure was characterized by rapid fluctuations, in keeping with the disturbed conditions that were prevalent over the United States.

The principal weather feature of the month was the continuance of the drought over the eastern portion of the country, and in some sections the month was the driest on record. This was particularly true of the Middle Atlantic States.

The first half of the month was generally cold with freezing weather at times in the interior of the South Atlantic and Gulf States, and temperatures below zero in the middle and northern Rocky Mountain districts. A disturbance from the Carribean Sea, that recurved to the northeastward over western Cuba during the 3d, reached Bermuda on the morning of the 5th with greatly increased development. The high area following from the interior of the United States moved well to the southward with the result that frost warnings issued on the morning of the 5th for the Southern States, including extreme northern Florida, were fully verified. A disturbance moved northward along the Atlantic coast during the 14th and 15th, attended by rains in the Gulf and South Atlantic States and the first general snow of the season in the Middle and North Atlantic States. This storm was also followed by frost in the South, reaching into northern Florida on the 16th and 17th. Warm weather set in from the northwest on the 16th and 17th, extending over the central valleys and Atlantic States on the 17th and 18th, and after this time there was no cold weather of consequence. From the 20th to the 26th two disturbances moved southeastward along the Rocky Mountain slope, turned sharply northeastward after reaching the thirty-fifth parallel, and then moved beyond Lake Superior with greatly increased energy. These storms were accompanied by widespread rains and snows and high winds, but the high areas following were not accompanied by low temperatures. When the first storm past over Oklahoma on the 23d severe local storms developed over northern Arkansas, resulting in the loss of several lives and the destruction of a considerable amount of property. There were also some severe storms on the day following in portions of Iowa.

BOSTON FORECAST DISTRICT.*

[New England.]

The weather of the month was exceptionally pleasant for the season. There were no prolonged severe storms, and the sunshine was much above normal, with an average for the entire district of twelve clear days. The precipitation was below the monthly average at all stations, and the departures ranged from 0.23 of an inch, at Bloomfield, Vt., to 3.90 inches at Bar Harbor, Me. Snow fell in measurable amounts in all the States except Rhode Island, where the total for the month was a trace. The largest monthly fall was 12 inches, at Enosburg, Vt. The temperature was slightly below normal during the first and second decades, and above during the third decade. The only zero temperature in the district was 4° below zero at Van Buren, Me., on the 19th.

Storm warnings were displayed on the 4th, 14th, 15th, 26th, and 30th. There were no storms without warnings.—*J. W. Smith, District Forecaster.*

NEW ORLEANS FORECAST DISTRICT.

[Louisiana, Texas, Oklahoma, and Arkansas.]

Warm weather prevailed except during the second decade. Frosts occurred over the northern portion of the district on the 12th and thruout the district on the 14th and 15th, for all of which timely warnings were issued. No severe weather conditions occurred without warnings, and all warnings issued

were verified except storm warnings issued for the Louisiana coast on the 13th and the Texas coast on the 28th, which failed of verification because the disturbances on which they were based decreased in intensity.—*I. M. Cline, District Forecaster.*

LOUISVILLE FORECAST DISTRICT.*

[Kentucky and Tennessee.]

The month, as a whole, was warm, and deficient in precipitation over nearly the whole district. There was one week, however, beginning with the 10th, that was quite cold, with temperatures ranging from 10° to 15° below normal conditions. The rainfall, while much below the average November amount at most places, was of inestimable value in breaking the long and disastrous drought. The first rains occurred in the period from the 9th to the 11th, and nearly all of the rest during the last week of the month. Snow occurred the night of the 13th and the morning of the 14th over a considerable portion of the eastern part of the district. It was quite heavy in the mountains of southeastern Kentucky and northeastern Tennessee.

There were only three disturbances of any consequence, the first occurring on the 9th and 10th, the second on the 23d and 24th, and the third on the 29th and 30th.

No special warnings were issued.—*F. J. Walz, District Forecaster.*

CHICAGO FORECAST DISTRICT.

[Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas, and Montana.]

The temperature was considerably above the normal over the district during the greater portion of the month, and no general cold-wave warnings were displayed until the 30th. The month closed with falling temperature over the entire district.

The month was noted for the scarcity of severe storms on the upper Lakes, and warnings were displayed only on the 23d, 25th, 26th, and 30th. High winds were reported at the various stations, following the display.—*H. J. Cox, Professor of Meteorology.*

DENVER FORECAST DISTRICT.*

[Wyoming, Colorado, Utah, New Mexico, and Arizona.]

The month was characterized by comparatively low mean temperatures thruout the greater part of the district, and by heavy snow on the middle eastern slope and in northern Utah. In northern Wyoming and in southern New Mexico and Arizona the weather was unusually dry.

Cold-wave warnings were issued on the morning of the 30th for eastern Wyoming and northeastern Colorado. They were fully verified. No other general cold wave visited the district during the month.—*F. H. Brandenburg, District Forecaster.*

SAN FRANCISCO FORECAST DISTRICT.†

[California and Nevada.]

There were fewer storms than usually occur at this time of the year. During the first decade, under the influence of an area of high pressure over the Basin ranges and the Rocky Mountain system, the weather was clear with surface winds from the north or northeast. Low morning fog repeatedly occurred. The midday hours were warm and clear and the night hours cool with more or less ground fog. There was no precipitation of consequence until November 20, when a moderate disturbance appeared on the northern coast, causing rain over the central and northern portions of the State, which gradually spread southward. The third decade was one of unsettled weather, and at the close of the month heavy frost occurred generally thruout the State. These were forecast accurately and all necessary warnings given.

A general warning for heavy frost was issued on Saturday, November 28. Warnings for light frost for various localities were issued on various dates during the month.

Southeast storm warnings were issued on the 25th for all stations from San Diego to Port Harford.—*A. G. McAdie, Professor and District Forecaster.*

PORTLAND, OREG., FORECAST DISTRICT.†

[Oregon, Washington, and Idaho.]

November was mild and dry with only about half as much rainfall as usual. Most of the precipitation fell between the 15th and the 23d in the western section, and between the 21st and the 24th in the eastern section. On the 16th and 17th, from 2 to 3 inches of rain occurred in the Puget Sound country, and it was heavy enough to cause freshets and a few washouts in a number of small streams draining that catchment basin. No snow fell in the western valleys, and none of consequence fell in the eastern valleys until near the end of the month, when an amount sufficient to cover the ground occurred over a wide area east of the Cascade Mountains.

The storm for which warnings were ordered at the close of October was unusually severe on Puget Sound, where the maximum wind velocities on the 1st were 50 miles from the south at Seattle, and 33 miles from the southwest at Tacoma.

A stormy period prevailed between the 16th and 23d, and only during three days of that time could storm warnings be safely lowered. The highest winds occurred during the afternoon of the 19th when a maximum velocity of 85 miles from the southeast was recorded at the North Head station. This storm interrupted telegraphic communication with coast seaports for a day or two, but no marine casualties are known to have happened, altho incoming vessels reported the storm to have been unusually severe along the entire coast from Cape Flattery to Eureka, Cal.

From the 4th almost uninterruptedly until the 15th the weather in this district was controlled by high-pressure areas overlying the Rocky Mountain States, which caused fair weather with raw easterly winds and many foggy mornings.—*E. A. Beals, District Forecaster.*

RIVERS AND FLOODS.

River conditions changed but little during the month. There was some slight recovery from the extreme low-water stages in the Ohio River, and the lower Mississippi River was higher than during the previous month. There were no floods except in the Neosho and lower Arkansas rivers, and the rivers of Oklahoma. They were caused by the heavy rains of the last week of the month over Oklahoma and southeastern Kansas, and particularly by those of the 27th and 28th. The floods were in full sway at the end of the month, and some report of them will be made in the MONTHLY WEATHER REVIEW for December, 1908.

As indicated in the MONTHLY WEATHER REVIEW for October, 1908, efforts were made to secure some reliable data regarding the flood losses in Oklahoma during that month, and the results, as shown in the following figures, are believed to be reasonably reliable:

Money value of property destroyed, exclusive of crop damage.	$500,000
Money value of crops destroyed	2,000,000
Damage by erosion	750,000
Losses thru enforced suspension of business, including wages.	170,000
Total	3,420,000

The highest and lowest water, mean stage, and monthly range at 204 river stations are given in Table IV. Hydrographs for typical points on seven principal rivers are shown on Chart I. The stations selected for charting are Keokuk, St. Louis, Memphis, Vicksburg, and New Orleans, on the Mississippi; Cincinnati and Cairo, on the Ohio; Nashville, on the Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport, on the Red.—*H. C. Frankenfield, Professor of Meteorology.*

* Morning forecasts made at district center, night forecasts made at Washington, D. C.

† Morning and night forecasts made at district center.